

Investigation of the dog and mouse tissue archives using complementary imaging techniques

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At Argonne National Laboratory between 1952 and 1991 beagle dog experiments were carried out and the effects of external irradiation with Cobalt-60 were the main focus of this study. Numerous different 'standard' tissues (including lymph nodes and tissues from organs showing different pathologies) from these animals were preserved and embedded in paraffin blocks. More than 7,000 dogs were subjected either to chronic γ irradiation exposure (22 hours/day) or to more intense fractionated or acute radiation exposure using the same irradiator. In the same period, γ -ray and neutron irradiation experiments with mice were done as well. Tissues from 7,000 dogs and 39,000 mice embedded in paraffin were collected, and both tissue archives are available for studies using novel imaging techniques. Studies conducted with archived tissue sections showed that in addition to standard histology staining with different dyes, X-ray fluorescence microscopy can be used to map elemental concentrations of biologically significant elements in these samples. Rapid XFM scans reveal the morphology of the tissue that can be matched with the adjacent histopathology tissue sections.

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